CERTIFICATE

By Authority Of
THE UNITED STATES OF AMERICA
Legally Binding Document

By the Authority Vested By Part 5 of the United States Code § 552(a) and Part 1 of the Code of Regulations § 51 the attached document has been duly INCORPORATED BY REFERENCE and shall be considered legally binding upon all citizens and residents of the United States of America. *HEED THIS NOTICE*: Criminal penalties may apply for noncompliance.

This Document Posted By
Public.Resource.Org, Inc.,
a California Nonprofit
Organization.

Not Affiliated Or
Authorized by ASTM
or by the United States
Government

Document Name: ASTM A285: Standard Specification for Pressure Vessel Plates, Carbon Steel, Low- and Intermediate-Tensile Strength

CFR Section(s): 49 CFR 179.300-7(a)

Standards Body: American Society for Testing and Materials

Official Incorporator:
THE EXECUTIVE DIRECTOR
OFFICE OF THE FEDERAL REGISTER
WASHINGTON, D.C.

AMERICAN NATIONAL STANDARD **ANSI/ASTM A 285 - 78**

Standard Specification for
PRESSURE VESSEL PLATES, CARBON STEEL, LOW- AND INTERMEDIATE-TENSILE STRENGTH[1]

This Standard is issued under the fixed designation A 285; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval.

This specification has been approved for use by agencies of the Department of Defense for listing in the DoD Index of Specifications and Standards.

1. Scope

1.1 This specification[2] covers carbon steel plates of low- and intermediate-tensile strengths which may be made by killed, semi-killed, capped, or rimmed steel practices at the producer's option. These plates are intended for fusion-welded pressure vessels.

1.2 Plates under this specification are available in three grades having different strength levels as follows:

Grade	Tensile Strength, ksi (MPa)
A	45–65 (310–450)
B	50–70 (345–485)
C	55–75 (380–515)

1.3 The maximum thickness of plates under this specification, for reasons of internal soundness, is limited to a maximum thickness of 2 in. (50 mm) for all grades.

1.4 Plates to a maximum thickness of ½ in. (13 mm) may be processed as coils. All such plates must be furnished by the producer in cut lengths only. When processed in this manner, an additional tension test per coil is required.

NOTE 1—For killed carbon steels only refer to the following ASTM specifications:[3]

A 299 Pressure Vessel Plates, Carbon Steel, Manganese-Silicon.

A 455 Pressure Vessel Plates, Carbon Steel, High Strength Manganese.

A 515 Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service.

A 516 Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service.

NOTE 2—The values stated in inch-pound units are to be regarded as the standard.

2. Applicable Documents

2.1 *ASTM Standard:*

A 20 Specification for General Requirements for Steel Plates for Pressure Vessels.[3]

3. General Requirements and Ordering Information

3.1 Material supplied to this material specification shall conform to the current issue of Specification A 20. These requirements outline the testing and retesting methods and procedures, permissible variations in dimensions and mass, quality and repair of defects, marking, loading, etc.

3.2 Specification A 20 also establishes the rules for the ordering information that should be complied with when purchasing material to this specification.

3.3 In addition to the basic requirements of this specification, certain supplementary requirements are available when additional control testing or examination is required to meet end use requirements. The purchaser is referred to the listed supplementary requirements in this specification and to the detailed requirements in Specification A 20.

3.4 If the requirements of this specification are in conflict with the requirements of Specification A 20, the requirements of this specification shall prevail.

---

[1] This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel and Related Alloys, and is the direct responsibility of Subcommittee A01.11 on Steel for Boilers and Pressure Vessels.

Current edition approved April 28, 1978. Published June 1978. Originally published as A 285 - 46. Last previous edition A 285 - 77.

[2] For ASME Boiler and Pressure Vessel Code applications see related Specification SA-285 in Section II of that Code.

[3] *Annual Book of ASTM Standards*, Part 4.

4. Heat Treatment

4.1 Plates are normally supplied in the as-rolled condition. The plates may be ordered normalized or stress relieved, or both.

5. Chemical Requirements

5.1 The steel shall conform to the requirements as to chemical composition as shown in Table 1.

6. Mechanical Requirements

6.1 *Tension Tests:*

6.1.1 *Requirements:*

6.1.1.1 The material as represented by the tension-test specimens shall conform to the requirements shown in Table 2.

6.1.2 *Number and Location of Tension Tests:*

6.1.2.1 When plates are processed as coils, one tension-test specimen shall be taken from the approximate center lap and one tension-test specimen shall be taken from the outer lap of the coil as rolled.

6.1.2.2 When plates are processed other than as coils, one tension test shall be taken from each plate as rolled as specified in Specification A 20.

SUPPLEMENTARY REQUIREMENTS

Supplementary requirements shall not apply unless specified in the order.

A list of standardized supplementary requirements for use at the option of the purchaser are included in Specification A 20. Those which are considered suitable for use with this specification are listed below by title.

S3. Simulated Post-Weld Heat Treatment of Mechanical Test Coupons,

S4. Additional Tension Test, and

S14. Bend Test.

Also listed below are additional optional supplementary requirements suitable for this specification:

S57. Copper-Bearing

S57.1 The copper content, by heat analysis shall be 0.20–0.35 % and by product analysis 0.18–0.37 %.

S58. Restricted Copper

S58.1 The maximum incidental copper content by heat analysis shall not exceed 0.25 %.

TABLE 1 Chemical Requirements

Elements	Composition, %		
	Grade A	Grade B	Grade C
Carbon, max[a]	0.17	0.22	0.28
Manganese, max			
Heat analysis	0.90	0.90	0.90
Product analysis	0.98	0.98	0.98
Phosphorus, max[a]	0.035	0.035	0.035
Sulfur, max[a]	0.040	0.040	0.040

[a] Applies to both heat and product analyses.

TABLE 2 Tensile Requirements

	Grade A		Grade B		Grade C	
	ksi	MPa	ksi	MPa	ksi	MPa
Tensile strength	45–65	310–450	50–70	345–485	55–75	380–515
Yield strength, min[a]	24	165	27	185	30	205
Elongation in 8 in. or 200 mm, min, %[b]	27		25		23	
Elongation in 2 in. or 50 mm, min, %	30		28		27	

[a] Determined by either the 0.2% offset method or the 0.5% extension-under-load method.

[b] See Specification A 20.

The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, 1916 Race St., Philadelphia, Pa. 19103, which will schedule a further hearing regarding your comments. Failing satisfaction there, you may appeal to the ASTM Board of Directors.